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PATENT APPLICATION  
Docket No. 14374.14

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE  
THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re application of:	Dennis H. Runnoe	)
		)
Serial No.:	09/639,684	)
		)
Filed:	August 15, 2000	)
		) Art Unit
For:	INTEGRAL CATHODE	) 2882
		)
Examiner:	Courtney D. Thomas	)
		)
Appeal No.:	_____	)

The Honorable Commissioner of Patents and Trademarks  
Washington, D.C. 20231

**BRIEF OF APPELLANT**

This is an appeal to the Board of Patent Appeals and Interferences (the "Board") from the Final Office Action dated January 25, 2005 wherein the Examiner rejected claims 8, 57, 59-81 and 83-94. This Brief is being filed under the provisions of 37 C.F.R. § 41.37. This Brief is accompanied by the requisite fee of \$500.00 as set forth in 37 C.F.R. § 41.20(b)(2). The Commissioner is hereby authorized to charge any additional fees associated with this communication, or to credit any overpayment, to Deposit Account No. 23-3178.

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## **LIST OF REFERENCES**

### **U.S. Patent Documents**

U.S. Patent No. 5,264,801 to *DeCou, Jr., et al.*

U.S. Patent No. 5,515,413 to *Knudsen, et al.*

U.S. Patent No. 4,788,705 to *Anderson*

## **I. REAL PARTY IN INTEREST**

The real party in interest comprises VARIAN MEDICAL SYSTEMS TECHNOLOGIES, INC., by way of assignment from VARIAN MEDICAL SYSTEMS, INC. The corresponding assignment document was recorded in the United States Patent and Trademark Office at Reel/Frame 014555/0261 on October 6, 2003. The named inventor, Dennis H. Runnoe, who is captioned in the present application, assigned his interest in the present application to VARIAN MEDICAL SYSTEMS, INC. The corresponding assignment document was recorded in the United States Patent and Trademark Office at Reel/Frame 011016/0184 on August 16, 2000.

## **II. RELATED APPEALS AND INTERFERENCES**

None.

## **III. STATUS OF CLAIMS**

Claims 8, 57, 59-81 and 83-94 are pending in this application. Claims 8, 57, 59-81 and 83-94 were rejected in the Final Office Action mailed January 25, 2005 (the "Final Office Action").

## **IV. STATUS OF AMENDMENTS**

The Appellant has not submitted any amendments subsequent to the Final Rejection.

## V. SUMMARY OF INVENTION

Exemplary embodiments of the present invention are generally concerned with an integral cathode having an emitter shaped in such a way as to direct emitted electrons along converging paths toward a common focal spot.

In one example, the integral cathode 200 includes an emitter 202 with a generally concave emissive surface, configured to be oriented toward a target surface 106 of a target anode 104 (specification at page 11, lines 11-14; Figure 3), and shaped so as to direct emitted electrons along converging paths toward a common focal spot *i* (Figure 3). In this example, the emitter 202 includes one or more cutouts 206, exemplified as a slot, that contribute to the definition of an electrical current path through the emitter (specification at page 11, lines 17-23; page 16, lines 10-15; Figure 2a). Finally, the emitter 202 is retained in a support cartridge 204 which aids in maintaining the curved shape of the emissive surface (specification at page 17, lines 23-24; Figures 1, 2B and 3).

## VI. ISSUES

- Issue 1: Whether claims 8, 57, 59-66, 78-81, 83 and 84-94 are unpatentable under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
- Issue 2: Whether claims 67-70, 75, 78, 84-86 and 94 are unpatentable under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,264,801 to DeCou, Jr. et al. (hereinafter "*DeCou*").
- Issue 3: Whether dependent claims 73, 74, 90 and 91 are unpatentable, under 35 U.S.C. §103(a), over *DeCou*.
- Issue 4: Whether dependent claims 76, 77, 92 and 93 are unpatentable, under 35 U.S.C. §103(a), over *DeCou* in light of U.S. Patent No. 5,515,413 to Knudsen et al. (hereinafter "*Knudsen*").
- Issue 5: Whether dependent claims 71, 72, 88 and 89 are unpatentable, under 35 U.S.C. §103(a), over *DeCou* in light of U.S. Patent No. 4,788,705 to Anderson (hereinafter "*Anderson*").

## VII. ARGUMENTS

A. **Issue 1:** Whether claims 8, 57, 59-66, 78-81, 83 and 84-94 are unpatentable under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

1. The Examiner has failed to properly apply the correct legal standard concerning rejections under 35 U.S.C. § 112, second paragraph, to show that claims 8, 57, 59-66, 78-81, 83 and 87 are indefinite.

With regard to claims 8, 57, 59-66, 78-81, 83 and 87, the Examiner has asserted that:

In particular, independent claims 8 and 78 (and dependent claim 87) attempt to define a structure of an emitter, describing the emitter as defining a cutout. Examiner concludes the recitation ‘and the emitter defining a cutout’ is ambiguous. Dependent claims 57, 59-66, 78-81 and 83 similarly suffer from this inherited deficiency.

*Final Office Action at paragraph 2 (emphasis added).*

Applicant respectfully disagrees that the claim recitation “and the emitter defining a cutout” is ambiguous and thereby renders claims 8, 57, 59-66, 78-81, 83 and 87 indefinite.

The rejection of claims 8, 57, 59-66, 78-81, 83 and 87 under 35 U.S.C. § 112, second paragraph is problematic for several reasons. First, the rejection of those claims is wholly conclusory inasmuch as the Examiner has adduced no evidence or argument whatsoever to support the rejection. Rather, the Examiner has simply stated “Examiner concludes the recitation ‘and the emitter defining a cutout’ is ambiguous.” This approach by the Examiner not only compromises the ability of the Applicant to effectively respond to the rejection, but is also contrary to well established examination guidelines. Particularly, where an Examiner has determined that a rejection is appropriate under 35 U.S.C. § 112, second paragraph, an analysis as to why the phrase(s) used in the claim are asserted to be ‘vague and indefinite’ should be included in the Office Action. *MPEP § 2173.02.* Moreover, such analysis would not only

advance the dialogue between the Applicant and the Examiner, but would also aid in the development of a clear record. The examination guidelines are in accord, stating that “the examiner should make the record clear by providing explicit reasoning for making or withdrawing any rejection related to 35 U.S.C. § 112, second paragraph.” (*Id.*, *emphasis added*).

As the foregoing makes clear, the Examiner has failed to adhere to established guidelines in connection with the examination of the rejected claims. Notwithstanding the failure of the Examiner to provide any analysis in support of the rejection of claims 8, 57, 59-66, 78-81, 83 and 87 under 35 U.S.C. § 112, second paragraph, it is clear in any event that such rejection lacks an adequate foundation.

In contrast with the approach taken by the Examiner, the examination of claims for definiteness under 35 U.S.C. § 112, second paragraph is not limited solely to consideration of the claim language. Rather, when examining a claim under 35 U.S.C. § 112, second paragraph, the definiteness of the claim language must be analyzed, not in a vacuum, but in light of various considerations, including the content of the particular application disclosure. *MPEP* § 2173.02. Decisions of the Court of Appeals for the Federal Circuit (the “Federal Circuit”) are in accord. Particularly, a claim is sufficiently definite if “one skilled in the art would understand the bounds of the claim when read in light of the specification.” *Allen Eng’g Corp. v. Bartell Indus.*, 299 F.3d 1336, 1348, 63 USPQ2d 1769 (Fed. Cir. 2002), *quoting Personalized Media Communications, LLC v. Int’l Trade Comm’n*, 161 F.3d 696, 705, 48 USPQ2d 1880 (Fed. Cir. 1998). *Emphasis added*. While it is evident from the Final Office Action that the Examiner improperly failed to consider the rejected claims in light of the specification, it is clear that when thus considered, as they must be, claims 8, 57, 59-66, 78-81, 83 and 87 satisfy the notice



function of 35 U.S.C. § 112, second paragraph by providing clear warning to others as to what constitutes infringement of the claims.

Contrary to the assertion of the Examiner, claims 8, 57, 59-66, 78-81, 83 and 87 are not indefinite when due consideration is given to the insight provided by the specification as to the meaning of the phrase ‘and the emitter defining a cutout.’ By way of example, the specification provides, with regard to emitter 202, that “slots 206 [Figure 2a] represent but one type of cut out portion adapted to define the aforesaid electrical current path. For example, slots 206 could be replaced with a plurality of overlapping holes. It will thus be appreciated that various shapes, sizes, numbers and arrangements of cutout portions may be combined in any number of ways so as to define a particular electrical current path and thereby facilitate achievement of a desired emissive effect.” *Specification at page 16, lines 10-15 (emphasis added)*. In addition, the cutouts defined by the emitter 202, exemplified as slots 206, are clearly disclosed in Figure 2A of the application.

In view of the unambiguous guidance provided by the specification as to the meaning of the phrase “spaced apart from the vacuum enclosure,” it is evident that the meaning of the language of the rejected claims 8, 57, 59-66, 78-81, 83 and 87 is readily discernible when considered in connection with the language of the specification, and that language accordingly satisfies the statutory purpose of 35 U.S.C. § 112, second paragraph, by clearly informing the public as to the boundaries of what constitutes infringement of those claims. In this regard, the Federal Circuit has held that “if the meaning of the claim is discernible, even though the task may be formidable and the conclusion may be one over which reasonable persons will disagree, we have held the claim sufficiently clear to avoid invalidity on indefiniteness grounds.” *Exxon Research & Eng'g Co. v. United States*, 265 F.3d 1371, 1375, 60 USPQ2d 1272 (Fed. Cir. 2001).

Finally, while the Examiner has asserted that the phrase “and the emitter defining a cutout” recited in claims 8, 57, 59-66, 78-81, 83 and 87 is ‘ambiguous’ and thereby renders those claims indefinite, the Examiner nonetheless found that phrase sufficiently definite that the Examiner was able to articulate a 35 U.S.C. § 102(b) rejection of claims 68-70, 75, 86 and 94. Particularly, the Examiner stated “DeCou, Jr. et al. disclose . . . the emitter defines at least one cutout.” *Final Office Action at paragraph 9*. The fact that the Examiner was sufficiently confident to characterize *DeCou* as making such a disclosure undercuts the assertion of the Examiner, made in connection with the rejection of claims 8, 57, 59-66, 78-81, 83 and 87, that the phrase “and the emitter defining a cutout” is ambiguous.

For at least the reasons presented above, claims 8, 57, 59-66, 78-81, 83 and 87 fully comply with the requirements of the second paragraph of 35 U.S.C. § 112, inasmuch as one skilled in the art, having the benefit of the disclosure of the specification, would readily discern and understand the bounds of those claims. Therefore, the rejection of claims 8, 57, 59-66, 78-81, 83 and 87 under 35 U.S.C. § 112, second paragraph, is not well taken and should be overruled by the Board.

**2. The Examiner has failed to properly apply the correct legal standard concerning rejections under 35 U.S.C. § 112, second paragraph, to show that claims 84-94 are indefinite.**

The Examiner has stated with regard to claims 84-94, that:

Independent claim 84 is directed to an X-ray device comprising a vacuum enclosure and a target anode having a target surface being disposed within the vacuum enclosure. It is unclear how the target anode and target surface are to be ‘spaced apart from the vacuum enclosure.’

*Final Office Action at paragraph 3.*

Applicant respectfully disagrees that the claim recitation that the target anode and target surface are “spaced apart from the vacuum enclosure” is ‘unclear’ and, as such, renders claims 84-94 indefinite.

Again, the Examiner has failed to consider the claims in light of the specification. As noted above in connection with the discussion of claims 57, 59-66, 78-81, 83 and 87, the definiteness of the claim language must be analyzed, not in a vacuum but in light of the content of the particular application disclosure. While the Examiner has improperly failed to consider the language of the claims in light of the specification, it is clear that when thus considered, as they must be, claims 84-94 satisfy the notice function of 35 U.S.C. § 112, second paragraph by providing clear warning to others as to what constitutes infringement of the claims.

By way of example, the specification clearly indicates at Figure 1 that there is a space between the target anode 104 and the vacuum enclosure 102. Further, Figure 1 also clearly discloses that there is a space between the target surface 106 and the vacuum enclosure 102. Thus, the specification unambiguously discloses an arrangement where the target anode and target surface are each “spaced apart from the vacuum enclosure.”

In view of the clear guidance provided by the specification as to the meaning of the recitation that the target anode and target surface are “spaced apart from the vacuum enclosure,” it is evident that the meaning of the language of the rejected claims 84-94 is readily discernible when considered in connection with the language of the specification, and that language accordingly satisfies the statutory purpose of 35 U.S.C. § 112, second paragraph, by clearly informing the public as to the boundaries of what constitutes infringement of those claims.

Moreover, arrangements such as are depicted in Figure 1 of this application and recited in claims 84-94, specifically, arrangements where a rotating anode and its associated target surface

are positioned so that a space exists between the target anode/target surface and the vacuum enclosure, are quite common in the field of x-ray tubes and x-ray devices. In view of the commonplace nature of such arrangements, it is clear that one of skill in the art would immediately comprehend the meaning of the language of claims 84-94.

For at least the reasons presented above, claims 84-94 fully comply with the requirements of the second paragraph of 35 U.S.C. § 112, inasmuch as one skilled in the art, having the benefit of the disclosure of the specification, would readily discern and understand the bounds of those claims. Therefore, the rejection of claims 84-94 under 35 U.S.C. § 112, second paragraph, is not well taken and should be overruled by the Board.

**B. Issue 2: Whether claims 67-70, 75, 78, 84-86 and 94 are unpatentable under 35 U.S.C. §102(b), as being anticipated by U.S. Patent No. 5,264,801 to DeCou, Jr. et al. (“*DeCou*”).**

**1. Consideration of previously presented (and subsequently canceled) claims 1, 5, 30, 44, 53, is germane to the analysis of pending claims 67-70, 75, 84-86 and 94 in view of similarities between those sets of claims.**

Previously presented (and subsequently canceled) independent claims 1, 5, 30, 44, 53 are similar to rejected pending claims 67-70, 75, 84-86 and 94. In particular, *canceled* claim 1 recited “said integral cathode including an emitter capable of discharging electrons, said emitter having a predetermined geometrical configuration oriented to cause at least some of the discharged electrons to converge at a focal spot” and *canceled* claim 5 recited “said emitter having a predetermined geometrical configuration oriented to cause at least some of the discharged electrons to . . . converge at a focal spot,” while *pending* independent claims 68 and 84 each recite “an emitter substantially comprising an emissive surface having a shape configured to direct a majority of electrons emitted from spatially diverse locations on the emissive surface to a common focal point proximate the target surface.”

In view of the aforementioned similarities between the canceled claims and the pending claims, consideration of the prosecution history of the canceled claims is relevant to an analysis of the currently pending claims. Accordingly, discussion is presented herein concerning the 35 U.S.C. § 102(b) rejection of canceled claims 1, 5, 30, 44, 53 in light of *DeCou*, as such rejection relates to the 35 U.S.C. § 102(b) rejection, in the Final Office Action, of pending claims 67-70, 75, 84-86 and 94 in light of *DeCou*.

Applicant notes with respect to the foregoing that when it became clear to the Applicant that, as discussed below, the Examiner was intent on maintaining the 35 U.S.C. § 102(b) rejection of independent claims 1, 5, 30, 44, 53 in view of *DeCou*, notwithstanding the lack of

support for that rejection, Applicant canceled claims 1-7 and 9-56, and added new claims 57-93 in an attempt to establish a basis upon which an agreement as to the allowability of the claims could be reached. *Request for Continued Examination under 37 C.F.R. 1.114 and Preliminary Amendment, filed July 9, 2004, at Page 2.* As to the new claims 57-93, Applicant clarified that “The addition of such new claims should not, however, be construed as an acquiescence on the part of the Applicant as to the purported teachings or prior art status of the cited art, nor as to the characterization of the cited art advanced by the Examiner.” *Id. at Page 11 (emphasis added).*

**2. The Examiner has failed to establish that *DeCou* anticipates claim 78.**

With regard to the rejection of independent claim 78, the Examiner has alleged in part that “DeCou, Jr. et al. disclose an integral cathode, comprising: an emitter (12) comprising an emissive surface having a shape configured to direct a majority of electrons (16) emitted from spatially diverse locations on the emissive surface to a common focal point (18).” *Final Office Action at paragraphs 8 and 14.* However, the aforementioned rejection is inapposite to claim 78, inasmuch as claim 78 does not recite “an emitter comprising an emissive surface having a shape configured to direct a majority of electrons emitted from spatially diverse locations on the emissive surface to a common focal point.” Instead, claim 78 recites, in part “an emitter substantially comprising a substantially concave emissive surface configured to be oriented toward a target surface of a target anode.” For at least this reason, the rejection of claim 78 in the Final Office Action is defective.

Further, the Examiner has failed, in any event, to establish that each and every element of claim 78 is disclosed in *DeCou*, arranged as required by that claim, or that the identical invention of claim 78 is disclosed in as complete detail in *DeCou* as is contained in the claim. See *MPEP* § 2131. For example, the Examiner has neither asserted nor established that *DeCou* discloses, or

suggests, “an emitter substantially comprising a substantially concave emissive surface configured to be oriented toward a target surface of a target anode, and the emitter defining a cutout” such as is recited in claim 78.

**3. Applicant has established that the *DeCou* reference fails to disclose each and every element of the identical invention of claims 67-70, 75, 84-86 and 94, and Applicant and the Examiner have agreed that the ‘cathode filament 12’ disclosed in *DeCou* does not implement the claimed focusing functionality.**

With regard to the rejection of independent claims 67 and 84, the Examiner has alleged in part that “*DeCou*, Jr. et al. disclose an integral cathode, comprising: an emitter (12) comprising an emissive surface having a shape configured to direct a majority of electrons (16) emitted from spatially diverse locations on the emissive surface to a common focal point (18).” *Final Office Action at paragraphs 8 and 14*. As discussed below however, the rejection of claims 67 and 84 is problematic for a variety of reasons.

For example, while the Examiner has asserted in the rejection of claims 67 and 84 that “*DeCou*, Jr. et al. disclose an integral cathode, comprising: an emitter (12) comprising an emissive surface having a shape configured to direct a majority of electrons (16) emitted from spatially diverse locations on the emissive surface to a common focal point (18),” *Final Office Action at paragraphs 8 (claim 67) and 14 (claim 84) (emphasis added)*, the Examiner has not offered any evidence in support of this assertion. Particularly, the Examiner has not identified any portion of *DeCou* as disclosing or suggesting that a “majority” of electrons emitted by the “cathode filament 12” are directed in any particular direction by that “cathode filament 12,” much less to a “common focal point.”

Moreover, in a contradiction that has never been addressed or resolved by the Examiner, the assertion by the Examiner that *DeCou* discloses an integral cathode having an emitter

“comprising an emissive surface having a shape configured to direct a majority of electrons (16) emitted from spatially diverse locations on the emissive surface to a common focal point” contrasts sharply with the earlier assertion of the Examiner that the “cathode filament 12” of *DeCou* is characterized by erratic electron propagation. *Office Action mailed January 9, 2003 at paragraph 9.*

With further reference to the aforementioned characterization of *DeCou* by the Examiner, it is clear that, notwithstanding such characterization, the record is replete with explicit admissions by the Examiner that *DeCou* fails to teach or suggest an emitter or emissive surface configured to cause [a majority of] discharged electrons to converge at a common focal point.

Initially, the Examiner took the position that *DeCou* disclosed an “emitter shaping an electron beam by causing at least some discharged electrons to converge at a focal spot (see Fig. 1; column 2, lines 61-65).” *Office Action mailed October 17, 2001 at paragraph 3.* In response, Applicant amended claims 1 and 5 (see *Appendix*) to recite “said emitter having a predetermined geometrical configuration oriented to cause at least some of the discharged electrons to converge at a focal spot.” *Amendment and Response to First Office Action, filed March 18, 2002, at page 2.* In connection with those amendments, Applicant noted that:

DeCou merely teaches the presence of a standard electron-producing filament, implemented in the form of a coiled wire (item 12 in Figure 1) and disposed within the housing of the evacuated chamber of an x-ray tube. There is nothing about the geometric shape of the filament coil that causes discharged electrons to be directed at the focal spot. DeCou merely teaches that the electron beam (16 in Figure 1) is formed when a ‘high DC potential is applied between the cathode filament and an anode target [14] causing an electron beam 16 [to] impact[ ] a focal spot 18 on a tungsten track 20 of the target.’ Moreover, nowhere does the reference suggest that the filament should be, or could be, shaped with any alternative geometric shape . . . to effect a different electron beam trajectory.

*Amendment and Response to First Office Action filed March 18, 2002, at page 9 (emphasis in original).*



Responsive to the amendments to claims 1 and 5, and the associated discussion, submitted by the Applicant, the Examiner conceded that *DeCou* failed to anticipate newly amended claim 1. In particular, the Examiner stated “As per claim 1, DeCou Jr. et al. do not explicitly disclose an emitter having a predetermined geometrical configuration oriented to cause at least some of the discharged electrons to converge to a focal spot.” *Office Action mailed July 8, 2002, at paragraph 4 (emphasis added)*. The Examiner again stated, in the same action, that “As indicated, DeCou Jr. et al., do not explicitly disclose the incorporation of an emitter having a predetermined geometrical shape configured to cause at least some of the discharged electrons to converge at a focal spot, or to be directed to the target surface of the target anode and to converge at a focal spot.” *Id. at paragraph 18 (emphasis added)*. See also, *Id. at paragraph 10*.

While the Examiner went on to state, in the Response to Arguments section, that “In order to compensate for this deficiency, *Miriam* is provided (U.S. Patent 3,558,967),” *Id. at paragraph 19 (emphasis added)*, Applicant responded by arguing that *Miriam* likewise failed to teach or suggest the claimed emitter. *Preliminary Amendment mailed November 8, 2002 at pp. 8-9*.

In the next office action, the Examiner did not directly address the comments of the Applicant concerning *Miriam* but, notably, did not rely on *Miriam* in any of the rejections posed in that action. Instead, the Examiner relied on a different combination of references but again conceded that “As per claims 1, 5 . . . , DeCou Jr. et al. do not explicitly disclose an emitter having a predetermined geometrical configuration oriented to cause at least some of the discharged electrons to converge to a focal spot.” *Office Action mailed January 9, 2003 at paragraph 6 (emphasis added)*.

In that same office action, the Examiner went on to assert that:

Barr [U.S. 4,739,214] discloses an emitter having a predetermined geometrical configuration oriented to cause at least some of the discharged electrons to converge at a focal spot (see Fig. 1, above; column 2, lines 63-68). It would have been obvious to modify . . . DeCou, Jr. et al. such that it incorporated an emitter possessing a predetermined geometrical configuration. One would have been motivated to make such a modification so that energetic loss due to erratic electron propagation is minimized and the full power of thermionic emissions are realized . . .

*Id. at paragraphs 8-9 (emphasis added).*

In asserting this allegedly obvious combination, the Examiner thus explicitly conceded that the failure of the *DeCou* device to include an emitter “having a predetermined geometrical configuration oriented to cause at least some of the discharged electrons to converge at a focal spot” is problematic, at least because the filament structure that is disclosed in *DeCou* is characterized by “erratic electron propagation” which causes an energetic loss and thereby contributes to a reduction in the power of thermionic emissions.

In connection with the response to the purportedly obvious combination of *Barr* and *DeCou* advanced by the Examiner, the Applicant noted that:

Figure 1 of *DeCou* clearly indicates that while electrons emitted from the filament 12 are somewhat dispersed initially, such electrons are subsequently focused into an electron beam that is directed toward a focal spot 18 on a tungsten track 20 of a target . . . Since the *DeCou* device is already configured to focus the electrons that are emitted from the filament, no advantage would be realized by modifying the *DeCou* device to include the emitter disclosed in *Barr*. *Response to First Office Action, filed June 6, 2003, at page 14. Emphasis deleted from original, other emphasis added.*

The foregoing statement by the Applicant that “Figure 1 of *DeCou* clearly indicates that . . . electrons emitted from the filament 12 are somewhat dispersed initially” (emphasis added) is fully consistent with the statements by the Examiner that the *DeCou* device suffers from a “deficiency” inasmuch as the *DeCou* device realizes an “energetic loss due to erratic electron propagation” (emphasis added). The prosecution history thus makes clear that the Applicant and the Examiner agreed that, in contrast with the claimed emitter, the “cathode filament 12”

disclosed in DeCou failed to implement or otherwise provide the claimed effect whereby the emitter caused at least some of the discharged electrons to converge at a focal spot.

Notwithstanding this clear agreement between the Applicant and the Examiner as to the failure of *DeCou* to disclose or suggest the claimed emitter, and the abundant evidence in support of that understanding, the Examiner then attempted to characterize the statements made by the Applicant as, apparently, constituting an admission which when considered in connection with the disclosure of *DeCou*, was sufficient, in the opinion of the Examiner, to establish anticipation of the claims.

4. **The Examiner conceded that the arguments advanced by the Applicant in the Response to First Office Action filed June 6, 2003 are persuasive but, inexplicably, advanced a new ground of rejection purportedly based upon statements made in such arguments, and upon the *DeCou* reference.**

In the next office action, the Examiner stated:

Applicant's arguments, see p. 14, lines 4-19 (Paper No. 15), filed 6/10/03, with respect to the rejection(s) of claims 1, 5, 28, 29, 30, 44 and 53 under 35 U.S.C. § 103 have been fully considered and are persuasive." Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of arguments presented in Paper No. 15 (noted above) with respect to the interpretation of recited claim limitations (i.e. geometrical configuration of included emitter) and previously applied reference: *DeCou, Jr. et al.* (U.S. Patent 5,264,801).

*Office Action mailed August 13, 2003, at paragraph 2 (emphasis added).*

The Examiner then went on to reject claims 1, 5, 28, 29, 30, 44 and 53, alleging, among other things, that "DeCou, Jr. et al. disclose an x-ray device, comprising . . . an emitter (12) capable of discharging electrons . . . wherein the emitter (12) has a predetermined geometrical configuration oriented to cause at least some of the discharged electrons to converge to a focal spot (see Fig. 1, above; see also column 2, lines 61-65)." *Id. at paragraphs 9, 11 and 15.*

It would thus appear that the Examiner took the view, in making the aforementioned rejection, that Applicant had made some sort of admission or characterization concerning the interpretation of certain claim limitations, where such purported admission or characterization, considered in connection with the disclosure of *DeCou* was sufficient to anticipate the claims. However, the Examiner failed to identify, with any specificity whatsoever, what statements made by the Applicant were alleged to constitute the purported admission, and what the specific nature and scope of the purported admission was. Moreover, Applicant did not, in the response at issue, submit argumentation as to the interpretation of any claim limitations. Rather, the commentary submitted by Applicant in that response was limited to a treatment of the defects in the cited references. See *Response to First Office Action, filed June 6, 2003*.

Particularly, and notwithstanding the assertions advanced by the Examiner in connection with the aforementioned rejection, it is clear that “none of the statements made by Applicant in Paper No. 15 constitute any kind of characterization or definition of any of the terms, elements or limitations of the pending claims. Rather, Applicant simply recites, verbatim, portions of selected pending claims.” *Amendment and Response to Second Office Action filed November 12, 2003, at page 13*.

In an attempt to determine the specific nature and scope of the rejection, and thereby clarify the record, Applicant requested an interview with the Examiner. Particularly, Applicant requested an interview in order to clarify: what is taught by *DeCou*, and the basis for the sudden and unexpected change of position by the Examiner in that regard; and, whether the 35 U.S.C. § 102(b) rejection posed by the Examiner in the Office Action mailed February 9, 2004 was based upon an allegation of inherency and, if so, whether or not there was an adequate supporting

rationale for such a rejection. *Request for Examiner Interview filed, March 1, 2004.* The Examiner however, refused to grant the requested interview.

- 5. The new rejection advanced by the Examiner mischaracterized the position taken by the Applicant throughout prosecution, was inconsistent with the position taken by the Examiner with regard to *DeCou* during earlier stages of prosecution, and was not supported by the *DeCou* reference.**

Inasmuch as the Examiner refused to grant an interview to clarify the aforementioned rejection, Applicant was compelled to attempt to decipher the meaning of that rejection. Accordingly, Applicant noted that:

As best understood by the Applicant, the aforementioned statement by the Examiner appears to be, at least, an allegation by the Examiner that Applicant has somehow defined or characterized (in Paper No. 15) the claim limitation directed to an “*emitter having a predetermined geometrical configuration oriented to cause at least some of the discharged electrons to converge at a focal spot*” as having some particular meaning and that such alleged definition or characterization, according to the Examiner, accordingly forms a proper basis for the rejections posed by the Examiner in the Office Action. However, as noted above, the Examiner has not cited any statements by Applicant that would tend to provide support for this allegation.

Notwithstanding the allegation of the Examiner that the new rejection of claims 1, 5, 28, 29, 30, 44 and 53 found support “in view of arguments presented in Paper No. 15 (noted above) with respect to the interpretation of recited claim limitations (i.e. geometrical configuration of included emitter) and previously applied reference,” *Office Action mailed August 13, 2003, at paragraph 2*, that allegation is plainly inconsistent with the position that Applicant has consistently maintained, with regard to *DeCou*, throughout the prosecution of this case. In that regard, Applicant noted that “Applicant has never made, and does not now make, such a concession, nor has Applicant ever so characterized the teaching of the *DeCou* reference. Rather, Applicant has consistently maintained, and continues to maintain, that *DeCou* fails to

teach, at least, the above-recited limitation.” *Amendment and Response to Second Office Action*, filed November 12, 2003, at page 14.

In this regard, Applicant noted further that:

[Applicant stated in the response] that “Figure 1 of *DeCou* clearly indicates that while electrons emitted from the filament are somewhat dispersed initially, such electrons are subsequently focused into an electron beam 16 that is directed toward a focal spot 18 on a tungsten track 20 of a target. See also, col. 2, lines 61-65,” and, further, that “the *DeCou* device is already configured to focus the electrons.” Nowhere do either of those statements by the Applicant attribute the focusing functionality to any specific element of the *DeCou* device, much less to the filament, as the Examiner has alleged.

*Amendment and Response to Second Office Action*, filed November 12, 2003, at page 13 (emphasis in original).

The foregoing thus makes clear that Applicant has never characterized the claims nor the *DeCou* reference in any way that could reasonably be interpreted to constitute an admission that *DeCou* had an anticipatory effect with respect to the claims.

Moreover, even if it were assumed, *arguendo*, that Applicant made an admission as to the disclosure of the *DeCou* reference, for example, an admission that *DeCou* disclosed or suggested the claimed emitter, there is no basis in logic for the Examiner to defer to an Applicant’s construction of the reference if that construction is not clearly supported by and/or is contradictory to the disclosure of the reference.

In this regard, it was noted at B.1. above that the Applicant and the Examiner reached an agreement during prosecution of this case that *DeCou* failed to disclose or suggest an “emitter with a predetermined geometrical configuration oriented to cause at least some of the discharged electrons to converge to a focal spot.” Nonetheless, the Examiner subsequently rejected the claims as being anticipated by *DeCou*, purportedly due to statements allegedly made by Applicant with regard to the claims in light of that reference. As discussed in detail at B.5.

below however, the Examiner has consistently failed to explain or resolve the contradiction of that position with the earlier position of the Examiner that *DeCou* failed to teach or suggest the claimed emitter.

Thus, while the Examiner has conceded on multiple occasions that *DeCou* fails to disclose or suggest the claimed emitter, the Examiner subsequently adopted a contrary construction of that reference, purportedly based on statements made by the Applicant, and notwithstanding the fact that, as discussed below, *DeCou* clearly fails to support the new construction advanced by the Examiner. As indicated above, there is simply no basis in logic for this change in position by the Examiner with respect to *DeCou*.

Not only does the rejection of claims 1, 5, 28, 29, 30, 44 and 53 in the Office Action mailed August 13, 2003 mischaracterize the position that Applicant has maintained throughout the prosecution of this application, but that rejection also contradicts the repeated concessions and admissions made by the Examiner with respect to the teachings of *DeCou*. Particularly, while the new rejection of claims 1, 5, 28, 29, 30, 44 and 53 in the Office Action mailed August 13, 2003 is based at least in part upon the purported disclosure in *DeCou* of “an x-ray device, comprising . . . an emitter (12) capable of discharging electrons . . . wherein the emitter (12) has a predetermined geometrical configuration oriented to cause at least some of the discharged electrons to converge to a focal spot,” *Office Action mailed August 13, 2003, at paragraphs 9-12 and 15, that characterization of the DeCou disclosure by the Examiner contradicts numerous other statements, admissions and characterizations made by the Examiner concerning DeCou during the course of the prosecution of this case.*

For example, in connection with the rejection of claim 1, the Examiner conceded that *DeCou* failed to anticipate that claim, stating “As per claim 1, DeCou Jr. et al. do not explicitly

disclose an emitter having a predetermined geometrical configuration oriented to cause at least some of the discharged electrons to a focal spot.” *Office Action mailed July 8, 2002, at paragraph 4 (emphasis added)*. The Examiner later stated, in the same action, that “As indicated, DeCou Jr. et al., do not explicitly disclose the incorporation of an emitter having a predetermined geometrical shape configured to cause at least some of the discharged electrons to converge at a focal spot, or to be directed to the target surface of the target anode and to converge at a focal spot.” *Id. at paragraph 18 (emphasis added)*. Later, the Examiner characterized the failure of the *DeCou* device to include an emitter such as that recited in the claims as a “deficiency.” *Id. at paragraph 19*.

In a subsequent action, the Examiner again conceded that *DeCou* failed to disclose the claimed emitter, stating “As per claims 1, 5 . . . DeCou Jr. et al. do not explicitly disclose an emitter having a predetermined geometrical configuration oriented to cause at least some of the discharged electrons to converge to a focal spot.” *Office Action mailed January 9, 2003, at paragraph 6 (emphasis added)*.

In order to remedy the “deficiency” in the teachings of *DeCou*, which deficiency the Examiner has repeatedly admitted to, the Examiner asserted that:

It would have been obvious to modify . . . *DeCou, Jr. et al.* such that it incorporated an emitter possessing a predetermined geometrical configuration. One would have been motivated to make such a modification so that energetic loss due to erratic electron propagation is minimized and the full power of thermionic emissions are realized . . .

*Id. at page 5, paragraph 9. Emphasis added.*

Thus, the Examiner again explicitly conceded the failure of the *DeCou* reference to disclose an emitter “having a predetermined geometrical configuration oriented to cause at least some of the discharged electrons to converge at a focal spot.” The Examiner then elaborated, stating that such a deficiency is problematic inasmuch as the filament structure that is disclosed



in *DeCou* is characterized by “erratic electron propagation” which causes an energetic loss and thereby contributes to a reduction in the power of thermionic emissions. *Id.*

As indicated above, Applicant addressed the contradictory positions taken by the Examiner concerning the disclosure of the *DeCou* reference. See *Amendment and Response to Second Office Action, filed November 12, 2003*. In response to the comments made by Applicant however, the Examiner proffered no substantive evidence or argument either to explain the contradiction or to support the new rejection, but instead simply asserted that:

Examiner believes however, DeCou, Jr. et al. (Patent ‘801) rightly meets the requirements for a 35 USC 102b rejection, since every element set forth in the claim is found, either expressly or inherently (compare claim language to DeCou Jr., et al. Fig. 1 above). Furthermore, Examiner has applied procedures commensurate with MPEP 2111 and 2111.01 during the examination of the current application and has concluded that the apparatus of DeCou Jr., et al. anticipates Applicants invention as claimed, including the limitation of an emitter having a predetermined geometrical configuration oriented to cause at least some of the discharged electrons to converge to a focal spot, since this feature is readily seen in Fig. 1 of DeCou Jr. et al (see above).

*Office Action mailed February 9, 2004 at paragraph 32.*

Thus, the Examiner ignored the clear contradiction in positions taken by the Examiner concerning the disclosure of *DeCou* and simply reasserted the previously stated rejection without any explanation.

In addition to the aforementioned defects of the 35 U.S.C. § 102(b) rejection posed by the Examiner in the Office Action mailed August 13, 2003, it is also clear that such rejection is neither supported by, nor consistent with, the disclosure of the *DeCou* reference, an assessment that has been steadfastly maintained by Applicant throughout the prosecution of this case.

In fact, the disclosure of *DeCou* with regard to electron emitters is very limited in scope and falls well short of providing any meaningful support for the characterization advanced by the Examiner in connection with the rejection of claims 1, 5, 28, 29, 30, 44 and 53 in the Office

Action mailed August 13, 2003. With reference to the “cathode filament 12” illustrated in Figure 1, *DeCou* states only that “A cathode filament 12 disposed within the envelope generates a cloud of electrons.” *Col. 2, lines 59-61 (emphasis added)*.

Thus, while Figure 1 of *DeCou* and the associated discussion indicate that at some juncture, the “cloud of electrons” becomes an “electron beam 16,” the Examiner has consistently failed to identify any support in that reference for the proposition, advanced by the Examiner, that it is the “cathode filament 12” that performs the focusing functionality responsible for the transformation of the emitted electrons from “cloud” to “beam.” More generally, the Examiner has failed to cite any portion of *DeCou* that attributes focusing functionality to any particular element of the *DeCou* device, much less to the “cathode filament 12.”

In addition, the Examiner has admitted that a “deficiency” of the *DeCou* device is that inasmuch as “DeCou Jr. et al. *do not explicitly disclose* an emitter having a predetermined geometrical configuration oriented to cause at least some of the discharged electrons to converge to a focal spot,” *Office Action mailed January 9, 2003 at paragraph 6 (emphasis added)*. Particularly, the Examiner has admitted that:

It would have been obvious to modify the apparatus of DeCou, Jr. et al. such that it incorporated an emitter possessing a predetermined geometrical configuration. One would have been motivated to modify [the *DeCou* device] . . . so that energetic loss due to erratic electron propagation is minimized and the full power of thermionic emissions are realized . . .

*Id. at paragraph 9 (emphasis added)*.

Thus, while the foregoing statements of the Examiner do not identify which component of *DeCou* the Examiner believes to implement a focusing function, those statements at least make clear that it is the view of the Examiner that the focusing function is not implemented by the “cathode filament 12.” That is, the foregoing statements make clear that the position of the

Examiner is, instead, that the disclosed cathode filament is characterized by “erratic electron propagation.” This assessment of the operation of the cathode filament, which the Examiner has never contradicted or disclaimed, is clearly contrary to the subsequent, and unsupported, assertion by the Examiner that *DeCou* discloses “an x-ray device, comprising . . . an emitter (12) capable of discharging electrons . . . wherein the emitter (12) has a predetermined geometrical configuration oriented to cause at least some of the discharged electrons to converge to a focal spot . . .” *Office Action mailed August 18, 2003, at paragraphs 9, 11 and 15.*

**6. Conclusion as to the purported anticipation of claims 67-70, 75, 78, 84-86 and 94 by *DeCou*.**

For at least the reasons presented above, the *DeCou* reference fails to anticipate independent claims 67 and 84, inasmuch as *DeCou* does not disclose each and every element of those claims (see *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)) arranged as required by the claims (see *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990)), nor does *DeCou* disclose the identical invention in as complete detail as is contained in the claims (see *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)). See also, *MPEP* § 2131. As independent claims 67 and 84 are not anticipated by *DeCou*, it necessarily follows that the corresponding dependent claims 68-70 and 75, depending from claim 67, and claims 85-86 and 94, depending from claim 84, are not anticipated by *DeCou*. Finally, the rejection of claim 78 is defective at least because the Examiner has failed to assert, or to demonstrate, that *DeCou* teaches all the limitations actually recited in claim 78.

In view of the foregoing, the rejection of claims 67-70, 75, 78, 84-86 and 94 under 35 U.S.C. § 102(b) is not well taken and should be overruled by the Board.

**C. Issue 3: Whether dependent claims 73, 74, 90 and 91 are unpatentable, under 35 U.S.C. §103(a), over *DeCou*.**

It is well settled that in order to establish a *prima facie* case of obviousness, it is the burden of the Examiner to demonstrate that three criteria are met: first, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; second, there must be a reasonable expectation of success; and third, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See M.P.E.P. § 2143. As discussed below however, the Examiner has failed to establish a *prima facie* case of obviousness with respect to claims 73, 74, 90 and 91.

By virtue of their dependence from independent claim 67, claims 73 and 74 each require, among other things, “an emitter substantially comprising an emissive surface having a shape configured to direct a majority of electrons emitted from spatially diverse locations on the emissive surface to a common focal point.” Similarly, claims 90 and 91 depend from claim 84 which requires, among other things, “an emitter substantially comprising an emissive surface having a shape configured to direct a majority of electrons emitted from spatially diverse locations on the emissive surface to a common focal point proximate the target surface.”

As discussed at B. above however, the Examiner has not shown that *DeCou* teaches or suggests the aforementioned limitation. Nor has the Examiner established that such limitation is taught or suggested by any of the other cited references. Thus, even if the *DeCou* device were to be modified in the purportedly obvious manner advanced by the Examiner, the resulting combination fails to include all the limitations of claims 73, 74, 90 and 91.

Not only does the combination advanced by the Examiner fail to include all the limitations of claims 73, 74, 90 and 91, but it is clear in any event that the Examiner has failed to

establish the existence of any suggestion or motivation to modify the *DeCou* device in the purportedly obvious fashion.

In rejecting claims 73, 74, 90 and 91, the Examiner has asserted that:

It would have been obvious . . . to modify the integral cathode of DeCou Jr. et al., such that the emitter comprised a refractory metal or doped with a dopant. One would have been motivated to make such a modification for the purpose of providing an emitter having good emissive characteristics and thermal stability for use in elevated temperatures.

*Final Office Action at paragraph 18 (emphasis added).*

With regard to the foregoing, Applicant notes that the terms “thermal *stability*” and “*elevated* temperatures” are relative terms that were introduced by the Examiner in the rejection. Inasmuch as the respective definitions of “thermal stability” and “elevated temperatures” are known only to the Examiner, the Examiner has failed to provide Applicant with sufficient information to enable Applicant to respond with certainty to the rejection. Nonetheless, the Examiner has not established that the temperature range of 1100°C - 1400°C disclosed in the *DeCou* reference, and discussed below, does not constitute “elevated” temperatures, nor has the Examiner established that the *DeCou* device lacks “thermal stability” at such temperatures.

That is, it is implicit in the rejection made by the Examiner that *DeCou* suggests that the disclosed emitter, “cathode filament 12,” is deficient in terms of its emissive characteristics and/or “thermal stability” at “elevated temperatures,” since, in the absence of such a suggestion, there would be no motive to make the modification advanced by the Examiner. However, the Examiner has not identified any portion of *DeCou* as making such a suggestion. In fact, it would appear from *DeCou* that the disclosed emitter already possesses suitable characteristics for the disclosed applications and is not in need of the modifications that the Examiner has proposed.

For example, *DeCou* indicates that an “advantage of the present invention is that it provides for an anode [14] which operates at temperatures above 1100°C. with a long tube life.” *Col. 2, lines 34-36*. Further, *DeCou* notes that “The electrical potential applied between the filament and the target to generate high energy x-rays, in the preferred embodiment, causes the electrons to impact the target track 20 anode with such energy, the target 14 becomes heated to the range of 1100°C - 1400°C.” *Col. 3, lines 1-5*. Inasmuch as the “cathode filament 12” is enclosed within the same “envelope 10” as the “anode target 14” (see Fig. 1), it would appear that the disclosed “cathode filament 12” is thermally stable at temperatures up to 1400°C.

Thus, there is no demonstrated motive to modify the *DeCou* emitter, either by the use of refractory metal or doping, since the Examiner has not established that *DeCou* demonstrates that the disclosed emitter lacks “thermal stability” at “elevated temperatures.” Particularly, the Examiner has not identified any portion of *DeCou* that even hints that at “elevated temperatures,” the disclosed “cathode filament 12” lacks thermal stability that could, or would, be improved by the use of refractory metal or doping. Consequently, the assertion of the Examiner that achievement of “thermal stability” would necessarily result from modification of the *DeCou* device, such that the emitter comprised a refractory metal or was doped with a dopant, is simply speculation. Finally, the disclosed “cathode filament 12” would presumably not be employed in the *DeCou* device if that emitter lacked thermal stability at elevated temperatures.

As noted above, the Examiner has also asserted that it would have been obvious to modify the *DeCou* device such that the emitter comprised a refractory metal or was doped with a dopant “for the purpose of providing an emitter having good emissive characteristics.” *Id.* (*emphasis added*). In this regard, Applicant notes that the term “good emissive characteristics”

is a relative term that was introduced by the Examiner in the rejection. Inasmuch as the definition of “good emissive characteristics” is known only to the Examiner, the Examiner has failed to provide Applicant with sufficient information to enable Applicant to respond with certainty to the rejection. Nonetheless, the Examiner has not established that the emissive characteristics of the emitter disclosed in the *DeCou* reference are not “good.” Particularly, the Examiner has not identified any portion of *DeCou* that even hints that the disclosed “cathode filament 12” lacks suitable emissive characteristics that could, or would, be improved by the use of refractory metal or doping. Thus, the assertion of the Examiner that achievement of “good emissive characteristics” would necessarily result from modification of the *DeCou* device, such that the emitter comprised a refractory metal or was doped with a dopant, is nothing more than speculation. In this regard, it is well established that the prior art can be modified or combined to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success. *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Finally, the disclosed “cathode filament 12” would presumably not be employed in the *DeCou* device if that emitter lacked “good emissive characteristics.”

As discussed above, the Examiner has failed to establish a *prima facie* case of obviousness with respect to claims 73, 74, 90 and 91, at least because the references, when combined, fail to include all the limitations of the claims, because there is no motive to make the combination proposed by the Examiner, and because there is no reasonable expectation that the proposed combination would be successful. Accordingly, the rejection of claims 73, 74, 90 and 91 under 35 U.S.C. § 103(a) is not well taken and should be overruled by the Board.

**D. Issue 4: Whether dependent claims 76, 77, 92 and 93 are unpatentable, under 35 U.S.C. §103(a), over *DeCou* in light of *Knudsen*.**

By virtue of their dependence from independent claim 67, claims 76 and 77 each require, among other things, “an emitter substantially comprising an emissive surface having a shape configured to direct a majority of electrons emitted from spatially diverse locations on the emissive surface to a common focal point.” Similarly, claims 92 and 93 depend from claim 84 which requires, among other things, “an emitter substantially comprising an emissive surface having a shape configured to direct a majority of electrons emitted from spatially diverse locations on the emissive surface to a common focal point proximate the target surface.”

As discussed at B. above however, the Examiner has not shown that *DeCou* teaches or suggests the aforementioned limitation. Nor has the Examiner established that such limitation is taught or suggested by any of the other cited references. Thus, even if the *DeCou* device were to be modified in the purportedly obvious manner advanced by the Examiner, the resulting combination fails to include all the limitations of any of claims 76, 77, 92 and 93.

Not only does the combination advanced by the Examiner fail to include all the limitations of claims 76, 77, 92 and 93, but it is clear in any event that the Examiner has failed to establish the existence of any suggestion or motivation to modify the *DeCou* device in the purportedly obvious fashion.

In rejecting claims 76, 77, 92 and 93, the Examiner has conceded that “DeCou, Jr. et al. “do not explicitly disclose an integral cathode wherein the support cartridge . . . [comprises] an electrically conductive portion and a non-electrically conductive portion.” *Final Office Action at paragraph 20*. Applicant would add that *DeCou* fails as well to implicitly disclose the claimed support cartridge.



In light of the failure of *DeCou* to disclose the claimed support cartridge, the Examiner has asserted that:

It would have been obvious to . . . provide a support for an integral cathode wherein the support cartridge comprised electrically conductive portions to provide current to an attached emitter thereby facilitating thermionic emission therefrom and to also contain non-conductive portions to insulate conductive portions to prevent electron flow to surrounding components.

*Id.* (emphasis added).

With respect to the foregoing, *DeCou* simply provides that “A cathode filament 12 disposed within the envelope generates a cloud of electrons.” *Col. 2, lines 59-60*. This passage from *DeCou* does not affirmatively state how the electron generation is stimulated. It would appear from the rejection then that the Examiner has assumed that the electrons generated in the *DeCou* device are produced by some process other than thermionic emission, inasmuch as the Examiner has asserted that it would be obvious to provide the *DeCou* device with a support cartridge comprising “electrically conductive portions to provide current to an attached emitter thereby facilitating thermionic emission therefrom.” *Final Office Action at paragraph 20*. However, there is no basis in *DeCou* for such an assumption. That is, the Examiner has not established precisely what the principle of operation of the disclosed “cathode filament 12” is. Consequently, the Examiner can only guess at what effect(s) may flow from the employment of the claimed support cartridge in the *DeCou* device.

The examination guidelines make clear however, that something more than a guess at the results of a combination is necessary to establish the requisite motivation to combine reference teachings. As noted above, the prior art can be modified or combined to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success. *In re Merck & Co.* In light of the limited disclosure in *DeCou* concerning the structure and operation of the disclosed

“cathode filament 12,” it is clear that there is no reasonable expectation that the modification proposed by the Examiner would be successful.

As noted above, the Examiner has further asserted that it would have been obvious to modify the *DeCou* device to include a support cartridge which, in addition to the “electrically conductive portions” discussed above, would also include “non-conductive portions to insulate conductive portions to prevent electron flow to surrounding components.” *Final Office Action at paragraph 20*. Notwithstanding this assertion, the Examiner has not identified any portion of *DeCou* that suggests that such a non-conductive portion is necessary, or even desirable. That is, the Examiner has not established that *DeCou* suggests that unchecked “electron flow to surrounding components” is even a concern with the disclosed device, much less a concern that could, or would, be resolved by the purportedly obvious modification advanced by the Examiner. Thus, the assertion of the Examiner that control of “electron flow to surrounding components” would necessarily result from modification of the *DeCou* device to include a support cartridge such as is recited in the claims is nothing more than speculation.

As discussed above, the Examiner has failed to establish a *prima facie* case of obviousness with respect to claims 73, 74, 90 and 91, at least because the references, when combined, fail to include all the limitations of the claims, because there is no motive to make the combination proposed by the Examiner, and because there is no reasonable expectation that the proposed combination would be successful. Accordingly, the rejection of claims 76, 77, 92 and 93 under 35 U.S.C. § 103(a) is not well taken and should be overruled by the Board.

**E. Issue 5: Whether dependent claims 71, 72, 88 and 89 are unpatentable, under 35 U.S.C. §103(a), over *DeCou* in light of *Anderson*.**

By virtue of their dependence from independent claim 67, claims 71 and 72 each require, among other things, “an emitter substantially comprising an emissive surface having a shape configured to direct a majority of electrons emitted from spatially diverse locations on the emissive surface to a common focal point.” Similarly, claims 88 and 89 depend from claim 84 which requires, among other things, “an emitter substantially comprising an emissive surface having a shape configured to direct a majority of electrons emitted from spatially diverse locations on the emissive surface to a common focal point proximate the target surface.”

As noted earlier herein, the Examiner has failed to demonstrate that *DeCou* teaches or suggests the aforementioned limitation. Nor has the Examiner established that such limitation is taught or suggested by any of the other cited references. Thus, even if the *DeCou* device were to be modified in the purportedly obvious manner advanced by the Examiner, the resulting combination fails to include all the limitations of claims 71, 72, 88 and 89.

Not only does the combination advanced by the Examiner fail to include all the limitations of claims 71, 72, 88 and 89, but it is clear in any event that the Examiner has failed to establish the existence of any suggestion or motivation to modify the *DeCou* device in the purportedly obvious fashion.

In rejecting claims 71, 72, 88 and 89, the Examiner has conceded that “DeCou, Jr. et al. “do not explicitly disclose an integral cathode where the emissive surface is substantially concave in shape and comprises one of a parabolic arc and circular arc.” *Final Office Action at paragraph 22*. Applicant would add that *DeCou* fails as well to implicitly disclose the claimed emissive surface.

In light of the failure of *DeCou* to disclose the claimed emissive surface, the Examiner has asserted that:

Anderson discloses an apparatus where the emissive surface of the emitter is substantially concave in shape and comprises one of a parabolic arc and a circular arc (see Fig. 5 above). It would have been obvious to modify the apparatus of DeCou, Jr. et al. such that it incorporated an emitter wherein the emissive surface of the emitter is substantially concave in shape. One would have been motivated to make such a modification so that electron emission is finely focused, due to the shape of the emitter thereby resulting in an increase in the resolving power of an X-ray apparatus as suggested by Anderson (see abstract; Fig. 5 above).

*Id.* at paragraph 25.

As discussed below, this assertion by the Examiner is problematic on a variety of fronts.

For example, Applicant notes that the term “finely focused” is a relative term that was introduced by the Examiner in the rejection. Inasmuch as the definition of “finely focused” is known only to the Examiner, the Examiner has failed to provide Applicant with sufficient information to enable Applicant to respond with certainty to the rejection. Nonetheless, the Examiner has not established that the electron emissions of the emitter disclosed in the *DeCou* reference are not “finely focused.”

Particularly, the Examiner has failed to establish either that the focusing of the *DeCou* device is in need of refinement in the first instance, or that use of the *Anderson* cathode could, or would, improve the focusing of the *DeCou* device. Thus, the assertion of the Examiner that a “finely focused” electron emission would necessarily result from modification of the *DeCou* device to include the *Anderson* cathode is nothing more than speculation. As noted above however, the prior art can be modified or combined to reject claims as *prima facie* obvious only if there is a reasonable expectation of success. *In re Merck & Co.* Moreover, the Abstract of *Anderson* fails to provide any motivation to make the purportedly obvious combination,

inasmuch as that Abstract does not, contrary to the assertion of the Examiner, refer to or suggest an increase in the “resolving power” of an X-ray apparatus.

In addition, it is clear that even if the *DeCou* device is modified in the purportedly obvious fashion advanced by the Examiner, the resulting device would be nonfunctional. Particularly, the Examiner has stated that “it would have been obvious to modify the apparatus of DeCou, Jr. et al. such that it incorporated an emitter wherein the emissive surface of the emitter is substantially concave in shape.” *Id.* (*emphasis added*). However, *Anderson* states, with regard to Figure 1 (Figure 5 of *Anderson* is similar) that “A dispenser cathode 18 and indirect heater 20 are mounted inside the bearing cathode structure 16. A rotating transformer . . . couples radio frequency power to the indirect heater 20.” *Col. 2, lines 25-30*. The foregoing thus indicates that both an indirect heater and a radio frequency power source are necessary for the operation of the *Anderson* “dispenser cathode 18.”

Inasmuch as the Examiner has not established that either an indirect heater or a radio frequency power source are taught or suggested by *DeCou*, modification of the *DeCou* device to simply incorporate the emitter of *Anderson* would result in a nonfunctional device. That is, even if the *Anderson* emitter were employed in the *DeCou* device, as the Examiner alleges would be obvious to do, such emitter would be of little use without both an indirect heater and a radio frequency power source. Because the purportedly obvious combination proposed by the Examiner would result in a nonfunctional device, it is clear that one of skill in the art would have no motivation to make such a combination. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 984).

Moreover, it is clear that the proposed modification of the *DeCou* device would necessarily change the principle of operation of that device. Particularly, the cathode of the

modified *DeCou* device would have to be operated in connection with the generation and transmission of radio frequency energy, as well as the use of an indirect heater, while it is not evident that the disclosed “cathode filament 12” operates in that fashion. In light of the foregoing, the teachings of the *DeCou* and *Anderson* references are insufficient to establish the obviousness of the combination advanced by the Examiner. *In re Ratti*, 270 F.2d 810, 813, 123 USPQ 349, 352 (CCPA 1959).

Finally, while the Examiner has not alleged that it would be obvious to modify the *DeCou* device to include the indirect heater and a radio frequency power source necessary for the operation of the *Anderson* emitter, it is not at all clear that such a modification could be performed, or that such a modification would even be successful in producing a useful device. In this regard, the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 682, 16 USPQ2d 1430, 1432 (Fed. Cir. 1990).

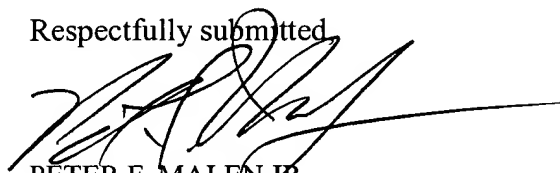
As discussed above, the Examiner has failed to establish a *prima facie* case of obviousness with respect to claims 71, 72, 88 and 89, at least because the references, when combined, fail to include all the limitations of the claims, because there is no motive to make the combination proposed by the Examiner, and because there is no reasonable expectation that the proposed combination would be successful. Accordingly, the rejection of claims 71, 72, 88 and 89 under 35 U.S.C. § 103(a) is not well taken and should be overruled by the Board.

## CONCLUSIONS

Based on the foregoing, Appellant respectfully submits that the rejections of the claims are not well taken. Accordingly, Appellant respectfully requests that the Board reverse the Examiner's rejections of claims 8, 57, 59-81 and 83-94 pending in this application and thereby place this application in condition for immediate allowance.

DATED this the 13<sup>th</sup> day of October, 2005.

Respectfully submitted,



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## VIII. APPENDIX

### A. CLAIMS ON APPEAL

1. **(Canceled)**<sup>1</sup> An x-ray device, comprising:
  - (a) a vacuum enclosure;
  - (b) an integral cathode disposed in said vacuum enclosure, said integral cathode including an emitter capable of discharging electrons, said emitter having a predetermined geometrical configuration oriented to cause at least some of the discharged electrons to converge at a focal spot;
  - (c) a power source connected to said emitter so that transmission of power from said power source to said emitter causes said emitter to discharge electrons; and
  - (d) a target anode disposed in said vacuum enclosure and having a target surface positioned to receive at least some of the electrons discharged by said emitter.
2. – 4. **(Canceled)**

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<sup>1</sup> Claim 1 is presented here in the form in which it was pending immediately prior to its cancellation in *the Request for Continued Examination under 37 C.F.R. 114 and Preliminary Amendment*, filed July 9, 2004.



5. **(Canceled)**<sup>2</sup> In an x-ray tube comprising a vacuum enclosure having disposed therein a target anode with a target surface, an integral cathode disposed in the vacuum enclosure and being spaced apart from the target surface of the target anode, the integral cathode comprising:

- (a) an emitter capable of discharging electrons, said emitter having a predetermined geometrical configuration oriented to cause at least some of the discharged electrons to be directed at the target surface of the target anode and converge at a focal spot; and
- (b) a support cartridge, said support cartridge providing structural support for said emitter.

6. – 7. **(Canceled)**

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<sup>2</sup> Claim 5 is presented here in the form in which it was pending immediately prior to its cancellation in *the Request for Continued Examination under 37 C.F.R. 114 and Preliminary Amendment*, filed July 9, 2004.

8. **(Previously presented)** In an x-ray tube comprising a vacuum enclosure having disposed therein a target anode with a target surface, an integral cathode disposed in the vacuum enclosure and being spaced apart from the target surface of the target anode, the integral cathode comprising:

- (a) an emitter configured to receive a flow of electrical current such that thermionic emission of electrons from the emitter is facilitated, said emitter having a predetermined geometrical configuration oriented to cause at least some emitted electrons to be directed at the target surface of the target anode and converge at a focal spot, wherein said predetermined geometrical configuration provides an emitter having a cross-section substantially in the shape of an arc so that a concave side of said emitter is directed towards the target surface of the anode, and the emitter defining a cutout; and
- (b) a support cartridge, said support cartridge providing structural support for said emitter.

9. - 56. **(Canceled)**

57. **(Previously presented)** The integral cathode as recited in claim 8, wherein the emitter is substantially confined within the support cartridge.

58. **(Canceled)**

59.     **(Previously presented)**     The integral cathode as recited in claim 8, wherein the arc shape of the emitter comprises one of: a substantially parabolic arc; and, a substantially circular arc.

60.     **(Previously presented)**     The integral cathode as recited in claim 8, wherein the emitter substantially comprises a single piece of material.

61.     **(Previously presented)**     The integral cathode as recited in claim 8, wherein the emitter substantially comprises a refractory metal.

62.     **(Previously presented)**     The integral cathode as recited in claim 8, wherein the emitter is doped with a dopant.

63.     **(Previously presented)**     The integral cathode as recited in claim 8, wherein the emitter comprises a plurality of subsidiary emitting portions.

64.     **(Previously presented)**     The integral cathode as recited in claim 8, wherein the support cartridge serves to substantially maintain the emitter in the arc shape.

65. **(Previously presented)** The integral cathode as recited in claim 8, wherein the support cartridge substantially comprises one of: a ceramic material; and, cataphoretically coated iron.

66. **(Previously presented)** The integral cathode as recited in claim 8, wherein the support cartridge comprises:

an electrically conductive portion; and

a non-electrically conductive portion.

67. **(Previously presented)** An integral cathode, comprising:

an emitter substantially comprising an emissive surface having a shape configured to direct a majority of electrons emitted from spatially diverse locations on the emissive surface to a common focal point, the emitter being configured to receive a flow of electrical current such that thermionic emission of electrons from the emitter is facilitated; and

a support cartridge within which the emitter is at least partially received.

68. **(Previously presented)** The integral cathode as recited in claim 67, wherein the emissive surface substantially comprises a single piece of material.

69.     **(Previously presented)**     The integral cathode as recited in claim 67, wherein the emitter is substantially confined within the support cartridge.

70.     **(Previously presented)**     The integral cathode as recited in claim 67, wherein the emitter defines at least one cutout.

71.     **(Previously presented)**     The integral cathode as recited in claim 67, wherein the emissive surface is substantially concave in shape.

72.     **(Previously presented)**     The integral cathode as recited in claim 71, wherein the substantially concave shape comprises one of: a substantially parabolic arc; and, a substantially circular arc.

73.     **(Previously presented)**     The integral cathode as recited in claim 67, wherein the emitter substantially comprises a refractory metal.

74.     **(Previously presented)**     The integral cathode as recited in claim 67, wherein the emitter is doped with a dopant.

75.     **(Previously presented)**     The integral cathode as recited in claim 67, wherein the support cartridge serves to substantially maintain the emitter in the shape.

76. **(Previously presented)** The integral cathode as recited in claim 67, wherein the support cartridge substantially comprises one of: a ceramic material; and, cataphoretically coated iron.

77. **(Previously presented)** The integral cathode as recited in claim 67, wherein the support cartridge comprises at least one of:

an electrically conductive portion; and

a non-electrically conductive portion.

78. **(Previously presented)** An integral cathode, comprising:

an emitter substantially comprising a substantially concave emissive surface configured to be oriented toward a target surface of a target anode, and the emitter defining a cutout; and

a support cartridge within which the emitter is at least partially received.

79. **(Previously presented)** The integral cathode as recited in claim 78, wherein the substantially concave shape comprises one of: a substantially parabolic arc; and, a substantially circular arc.

80.     **(Previously presented)**     The integral cathode as recited in claim 78, wherein the emissive surface substantially comprises a single piece of material.

81.     **(Previously presented)**     The integral cathode as recited in claim 78, wherein the emitter substantially comprises a refractory metal.

82.     **(Canceled)**

83.     **(Previously presented)**     The integral cathode as recited in claim 78, wherein the support cartridge comprises:

an electrically conductive portion; and

a non-electrically conductive portion.

84. **(Previously presented)** An x-ray device, comprising:

a vacuum enclosure;

a target anode having a target surface and being substantially disposed within the vacuum enclosure such that the target anode and target surface are spaced apart from the vacuum enclosure; and

an integral cathode substantially disposed within the vacuum enclosure and comprising:

an emitter substantially comprising an emissive surface having a shape configured to direct a majority of electrons emitted from spatially diverse locations on the emissive surface to a common focal point proximate the target surface; and

a support cartridge within which the emitter is at least partially received.

85. **(Previously presented)** The x-ray device as recited in claim 84, wherein the emitter is configured to receive a flow of electrical current such that thermionic emission of electrons from the emitter is facilitated.

86. **(Previously presented)** The x-ray device as recited in claim 84, wherein the emissive surface of the emitter substantially comprises a single piece of material.

87. **(Previously presented)** The x-ray device as recited in claim 84, wherein the emitter defines at least one cutout.



88.     **(Previously presented)**     The x-ray device as recited in claim 84, wherein the emissive surface is substantially concave in shape.

89.     **(Previously presented)**     The x-ray device as recited in claim 88, wherein the substantially concave shape comprises one of: a substantially parabolic arc; and, a substantially circular arc.

90.     **(Previously presented)**     The x-ray device as recited in claim 84, wherein the emitter substantially comprises a refractory metal.

91.     **(Previously presented)**     The x-ray device as recited in claim 84, wherein the emitter is doped with a dopant.

92.     **(Previously presented)**     The x-ray device as recited in claim 84, wherein the support cartridge substantially comprises one of: a ceramic material; and, cataphoretically coated iron.

93. **(Previously presented)** The x-ray device as recited in claim 84, wherein the support cartridge comprises at least one of:

an electrically conductive portion; and

a non-electrically conductive portion.

94. **(Previously presented)** The x-ray device as recited in claim 84, wherein the support cartridge facilitates maintenance of the emitter in a predetermined shape.

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**COMBINED TRANSMITTAL OF APPEAL BRIEF TO THE BOARD OF PATENT  
APPEALS AND INTERFERENCES & PETITION FOR EXTENSION OF TIME  
UNDER 37 C.F.R. 1.136(a) (Large Entity)**

Docket No.  
14374.14

In Re Application Of: **Dennis H. Runnoe**

Application No.	Filing Date	Examiner	Customer No.	Group Art Unit	Confirmation No.
09/639,684	August 15, 2000	Courtney D. Thomas	022913	2882	4147

Invention: **INTEGRAL CATHODE**



COMMISSIONER FOR PATENTS:

This is a combined Transmittal of Appeal Brief to the Board of Patent Appeals and Interferences and petition under the provisions of 37 CFR 1.136(a) to extend the period for filing an Appeal Brief.

Applicant(s) hereby request(s) an extension of time of (check desired time period):

☐ One month      ☒ Two months      ☐ Three months      ☐ Four months      ☐ Five months

from: August 13, 2005      until: October 13, 2005  
Date      Date

The fee for the Appeal Brief and Extension of Time has been calculated as shown below:

Fee for Appeal Brief: \$500.00

Fee for Extension of Time: \$450.00

**TOTAL FEE FOR APPEAL BRIEF AND EXTENSION OF TIME:** \$950.00

The fee for the Appeal Brief and extension of time is to be paid as follows:

☐ A check in the amount of \_\_\_\_\_ for the Appeal Brief and extension of time is enclosed.

☐ Please charge Deposit Account No. \_\_\_\_\_ in the amount of \_\_\_\_\_

☒ The Director is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. **23-3178**

☒ Any additional filing fees required under 37 C.F.R. 1.16.

☐ Any patent application processing fees under 37 CFR 1.17.

☒ If an additional extension of time is required, please consider this a petition therefor and charge any additional fees which may be required to Deposit Account No. **23-3178**

☒ Payment by credit card. Form PTO-2038 is attached.

**WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.**

**COMBINED TRANSMITTAL OF APPEAL BRIEF TO THE BOARD OF PATENT  
APPEALS AND INTERFERENCES & PETITION FOR EXTENSION OF TIME  
UNDER 37 C.F.R. 1.136(a) (Large Entity)**

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Application No. <b>09/639,684</b>	Filing Date <b>August 15, 2000</b>	Examiner <b>Courtney D. Thomas</b>	Customer No. <b>022913</b>	Group Art Unit <b>2882</b>	Confirmation No. <b>4147</b>
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Invention: **INTEGRAL CATHODE**

TO THE COMMISSIONER FOR PATENTS:

This combined Transmittal of Appeal Brief to the Board of Patent Appeals and Interferences and petition for extension of time under 37 CFR 1.136(a) is respectfully submitted by the undersigned:

  
Signature

Dated: October 13, 2005

**Peter F. Malen, Jr.**  
**Attorney for Applicant**  
**Reg. No. 45,576**  
**Telephone No. 801-533-9800**

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Docket No.

**14374.14**

Application No.

**09/639,684**

Filing Date

**August 15, 2000**

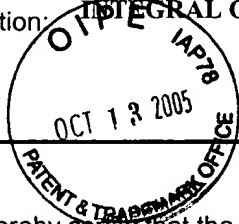
Examiner

**Courtney D. Thomas**

Customer No.

**022913**

Group Art Unit

**2882**Invention: **INTEGRAL CATHODE**

I hereby certify that the following correspondence:

**Brief of Appellant (50 pgs in triplicate); Combined Transmittal of Appeal Brief & Petition for Extension of Time (2 pgs in triplicate); Credit Card Payment Form and Postcard***(Identify type of correspondence)*

is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on

October 13, 2005*(Date)*Gina Meredith*(Typed or Printed Name of Person Mailing Correspondence)**(Signature of Person Mailing Correspondence)*EV 680255989 US*("Express Mail" Mailing Label Number)***Note: Each paper must have its own certificate of mailing.**